



# Interlocking Vocational and Academic Education – Challenges and Opportunities for Universities and Occupationally Qualified Students

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**Abstract:** In the context of the opening of universities for occupationally qualified prospective students in Germany, new study formats are emerging that are explicitly aimed at qualified professionals. Based on changed qualification and skill requirements, extra-occupational study programs in the field of science, technology, engineering and mathematics are particularly gaining in importance. This article provides a short overview of empirical findings on both the organizational structure and the interlocking of theory and practice within extra-occupational degree courses in the area of natural science and technology. Furthermore motivations, requirements and interests of vocationally qualified and employed students are shown.

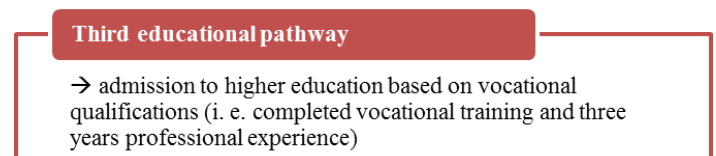
**Key words:** permeability of educational domains, third educational pathway, extra-occupational study programs, didactics, vocationally qualified students

## I-INTRODUCTION

Due to globalization, demographic changes and the ongoing digitalization of workplaces, the German labour market is subject to continuous change. The complexity of occupational tasks and work assignments increases, which leads to new skill requirements both on the systematic and the cognitive level. These skill requirements are most notably in science, technology, engineering and mathematics (STEM)<sup>1</sup>, thus occupational fields that are already characterized as highly complex. Since the university graduate numbers in STEM remain low, current needs for specialists can only be covered partly and the German labour market is faced with a serious shortage of skilled workers (Anger et al. 2018, Burstedde et al. 2017). In order to deal with the difficulties at hand, upskilling becomes increasingly important and discerning forms of both vocational and academic further education, such as extra-occupational study programs, significantly gain in relevance (Meyer and Beutnagel 2018, Schanz 2017).

The above described developments in view of work and employment are marking a crucial starting point for processes of change within the German educational policy. Interlocking the previously distinct systems of vocational and higher education as well as establishing a high permeability between these different educational domains have become significant

educational objectives. Among other things, this manifests in the effort of opening up higher education institutions for occupationally qualified people, meaning potential students on the so called *third educational pathway* (cf. Fig. 1).



**Figure 1:** The third educational pathway in Germany

The opening of universities for the occupationally qualified leads to a sharp increase in the number of potential students. In addition, many different education policy programmes that are focused particularly on experienced professionals are developed in order to expand the permeability between vocational and higher education (Hillebrecht 2016). Despite the growth of degree courses for occupationally qualified and employed prospective students, people reaching university on the third educational pathway still form a small minority in the German higher education system. The proportion students without a school diploma for university admission joining higher education institutions, is only about three percent

<sup>1</sup> In the German education policy the abbreviation STEM refers to occupations, occupational groups and courses of study in the

fields of natural sciences, technology, engineering and mathematics (Dittmann/Kreutz 2016).

(Autorengruppe Bildungsberichterstattung 2018). This fact leads to the hypothesis that, in addition to formal regulations, obstacles exist on the individual and/or structural level that prevent these students from gaining access to university education.

Extra-occupational study programs are characterized by a parallelism of full- or part-time professional activity and further qualification at the university. This does not necessarily mean that work processes and learning processes are linked in terms of content and organization. With regard to extra-occupational offerings, the question arises as to whether and to what extent a combination of scientific theory and vocational practice is actually established.

By expanding the access possibilities to higher education, the target group of occupationally qualified students differentiates further. The student body taking part in extra-occupational academic teaching formats becomes more and more diverse and is strongly characterized by heterogeneity. Employed students in the field of STEM look back on various work and vocational learning experiences and their specialist knowledge differs greatly. Other than full-time students, participants in extra-occupational degree courses tend to have a strong desire for career-related further education in order to realize promotion prospects at their workplace. In addition to this goal of professional development, employed students show a very high personal interest in subject contents (Dittmann and Kreutz 2016).

Due to these specific characteristics, employed students in the field of STEM pose new demands on both university teaching and study structure (Jürgens 2017). The development and implementation of didactic models as well as teaching and learning settings that are tailored to employed students is highly required at academic institutions. This is due to the fact that the specific combination of vocational and academic knowledge within academic education offers the chance to systematically interlock and further develop practical, experiential with theoretical, analytical knowledge. Currently, very few concepts of didactics that are focused on degree courses for vocationally qualified students exist, much less are implemented in higher education (Baumhauer 2017).

## II EMPIRICAL APPROACH: STEM-RESEARCH PROJECT:

Against the background of the problematic outline described above, a research group of the Institute of Vocational and Adult Education of Leibniz University Hanover analyzed extra-occupational study programs in STEM<sup>2</sup>. The key goal was to generate transparent and systematic empirical findings about extra-occupational study programs in order to gain insights in their curricular conception as well as their practical

implementation. In addition, identifying motives and requirements of vocationally qualified employed students in extra-occupational degree courses was an essential research focus.

Within the framework of the project, only STEM bachelor's degree programs, which were promoted as studiable concurrent to a full-time occupation and allowed a participation on the basis of vocational qualifications (i.e. via the third educational pathway) were considered. The empirical study was conducted along the following overarching research questions

1. Which structural features do extra-occupational study Programs in STEM have?
2. In what way are vocational and academic teaching and learning interlocked on the organizational as well as the didactical level?
3. What challenges are employed students faced with? What factors promote or inhibit their educational success?

As a first approximation to the field of research, qualification offers that are relevant for employees in scientific and technical sectors were identified via web based research. On the basis of the results, eight study formats typical for the STEM sector were selected and analyzed exemplarily. The structural as well as the didactical design of the formats were explored on the basis of content and document analyses, guideline interviews and participatory observations in different lectures. The interview partners selected were administratively responsible persons, course coordinators, lecturers and professionally experienced and employed students.

### 2.1 Institutional and Structural Framework

The projects findings show clearly that in the field of STEM private higher education institutions significantly gain in relevance. With the growth of extra-occupational degree courses offered by private providers, a sector is emerging in the German education system that is organized economically. Private providers charge high tuition fees. This is due to the fact that these providers have to use fees and charges as means of securing their financing. The decision-making power over the amount of fees to be paid for the participation in private study formats lies within the authority of the respective institution. This means that high tuition fees do not necessarily guarantee certain standards of study quality. In addition, the economic organization of part-time studies leads to the emergence of new forms of cooperation and networking (i. e. between universities and companies). The effects that the influence of different economic players can cause on research and study content is currently largely open.

Some of the universities offering extra-occupational degree courses establish their own admission regulations, which go beyond the formal legal regulations on admission to higher

<sup>2</sup> The research project „Durchlässigkeit in naturwissenschaftlich-technischen (MINT-)Berufen“ was conducted from 3/2014 to 06/2017. Funding was provided by

the Hans-Böckler-Foundation. In depth results were published by Beutnagel et al. 2018.

education. Furthermore, even in formats that are promoted to be studiable parallel to a full-time occupation, the options to schedule work and studies are often times limited. These large differences in admission requirements and study organization create and intensify problems of transparency and quality assurance within the field of extra-occupational degree courses in STEM.

## 2.2 Lack of Systematic Linkage between Theory and Practice

The interlocking of vocational and higher education, e.g. in the sense of a vocational and practical orientation of the courses' content, is explicitly stated in module handbooks and course descriptions of the study programs examined. However, the project results show that a combination of theory-based study content with practical knowledge and skills of the participating employed students is only rudimentarily successful. Although the offerings are focused on the practical requirements of the occupational field with an affinity to the subject of study, an interlocking of practical and scientific knowledge still poses a major challenge for universities. This is evident regarding both study organization and didactic guidelines: A systematic combination of professional and academic forms of teaching and learning can not be found in the majority of cases.

The cooperation between universities offering extra-occupational studies with the companies and enterprises in which the participating students work, are only marginally present and not systematically maintained. In some cases, a connection between university and company is even deliberately avoided. A justification for this lies in the wish for a substantive and/or financial independence of the higher education institution from economic interests.

Concerning the didactic design of extra-occupational study programs, it is striking that for the most part the didactic approaches and methods used in extra-occupational study programs are not specifically aimed at the needs of professionally experienced students. The results obtained from the interviews and participatory observations point to a clear focus on teacher-centered forms of teaching. Frontal teaching (partly in combination with exercises) form a priority course format within the study programs examined. In the most case, practical references are established by using examples from the students' or the teaching staff's professional experiences. The use of teaching forms such as self-organized, project-oriented and case-based learning is the responsibility of the individual lecturers. However, the results of the interviews and participatory observations indicate that a certain tension between the great extent of material to be covered, the limited teaching time and the courses' didactical preparation.

An additional problem is that the teaching staff is not getting professionally prepared for educating the target group of occupationally qualified and employed students. To a large extent the lectures' quality in the extra-occupational study formats depends on the lecturer in question and his or her attitude towards the occupationally qualified students.

## 2.3 Success Factors of Occupationally Qualified Students

The project results show that the professional experience and the knowledge acquired and deepened by the students in their careers, have a major influence on the success of their studies. Most students state that they can fall back on their professional knowledge during their studies and that this helps them to understand the contents of their studies better. On the other hand, the knowledge gained at university helps them to act more competent in practical contexts. These remarkable results are hardly taken into account by the providers of extra-occupational study programs. At the structural and didactical levels, the interlinking of practical professional experience and scientific knowledge is often times not planned by universities. The lack of structural theory-practice interlinking on the part of the providers and the teaching staff employed in the formats is therefore compensated by the students themselves.

Predominantly the participants' motivation to study results from a deliberately reflected comparison of career development opportunities. The academic qualifications of colleagues and superiors are often seen as a major factor for the realization of career advancement. Some of the orientations and motivations of the students can thus be interpreted as individual "academisation" in the sense of occupation-related continuing training behavior. From the perspective of a STEM professional, extra-occupational degree courses can serve to reach career goals that are perceived to be limited on the basis of previous initial and continuing vocational training. In this respect, the results of the study show that a combination of occupation and university studies is part of the students' study motivation. For the participants, studying aims at expanding the autonomy and scope of action in the originally chosen occupational field. After completing their studies, the students expect their scope for professional action to increase into more knowledge-intensive and self-responsible forms of work (Dittmann 2016).

## III CONCLUSION AND OUTLOOK

Vocationally oriented higher education plays a key role within the German educational policy, since it offers opportunities for lifelong learning and the permeability between the different educational sectors. However, the research findings show that a systematic link between theory and practice is not widely implemented, yet. The practical implementation of the extra-occupational degree courses for scientific and technical occupational groups deviates from its public promotion. Thus, a clear discrepancy between the study program and the structural-organizational as well as didactic-curricular design of the formats can be noted. Further education-oriented didactics that follow on from professional experience as well as knowledge of learning and relates these factors to scientific theoretical approaches need to be focused (Baumhauer 2017)

In regards to the growth and increasing variety of study programs that are explicitly focused on professionally experienced students and the consequential institutional differentiation in the German education system, the question of quality assurance of study programs arises in a new way. To

date, quality criteria for degree courses have not been sufficiently analyzed - neither theoretically nor empirically. In the sense of quality orientation, the issue of the professionalization of educational staff gains in significance.

In the scope of the further opening of universities to lifelong learning, expanding international perspectives in the field of university continuing education needs to be an essential focus. A new research task is to work intensively on the topic of didactics in the context of higher education from an internationally comparative perspective. Possible starting points for research projects or field approaches can be generated, for example, via the direct collaboration of research organizations beyond national borders.

### References

- [1] Anger, C., Koppel, O. and Plünnecke, A. MINT-Führungsreport MINT – Offenheit, Chancen, Innovationen, Cologne, 2018.
- [2] Autorengruppe Bildungsberichterstattung (Ed.) Bildung in Deutschland. Ein indikatorengestützter Bericht mit einer Analyse zu Wirkungen und Erträgen von Bildung, Bielefeld: wbv, 2018.
- [3] Baumhauer, M. Berufsbezug und Wissenschaftsorientierung. Grundzüge einer Didaktik wissenschaftlich reflektierter (Berufs-)Praxis im Kontext der Hochschulweiterbildung, Detmold: Eusl, 2017.
- [4] Beutnagel, B., Dittmann, C., Meyer, R. and Baumhauer, M. “Berufsbegleitende Studiengänge im MINT-Sektor - Zwischen Anspruch und Wirklichkeit, Study 375 of the Hans-Böckler-Stiftung, Düsseldorf, 2018.
- [5] Burstedde, A., Malin, L. and Risius, P. Fachkräfteengpässe in Unternehmen. Rezepte gegen den Fachkräftemangel: Internationale Fachkräfte, ältere Beschäftigte und Frauen finden und binden”, Study 4 of the IW, Cologne, 2017.
- [6] Dittmann, C. Mit Berufserfahrung an die Hochschule. Orientierungen berufsbegleitend Studierender im MINT-Bereich. Münster and New York: Waxmann, 2016.
- [7] Dittmann, C. and Kreutz, M. Mit Beruf ins Studium. Herausforderungen für Hochschulen und Lernende, in Faßhauer, U. and Severing, E. (Ed.) Verzahnung beruflicher und akademischer Bildung. Duale Studiengänge in Theorie und Praxis, Bielefeld: wbvpp, 2016, 157-172.
- [8] Hillebrecht, L. “Entwicklung eines Modells zur Beurteilung der Qualität von berufsbegleitenden Studiengängen”, in Seilfried, J., Seeber, S. and Ziegler, B. (Ed.) “Jahrbuch der berufs- und wirtschaftspädagogischen Forschung Opladen: Barbara Budrich, 2016, 141-154.
- [9] Jürgens, A. Determinanten des Studienerfolgs. Nichttraditionell Studierende in ingenieurwissenschaftlichen Studiengängen, Bielefeld: wbv, 2017.
- [10] Meyer, R., Beutnagel, B. Programmatik versus Realität: Vermittlung von Theorie und Praxis in hybriden Bildungsformaten, berufsbildung – Zeitschrift für Theorie-Praxis Dialog, Vol. 170, 2018, 19-20.
- [11] Schanz, H. Akademisierung des Beschäftigungssystems, in Bonz, B., Schanz, H. and Seifried, J. “Berufsbildung vor neuen Herausforderungen. Wandel von Arbeit und Wirtschaft, Baltmannsweiler: Schneider Verlag, 2017, 70-88.